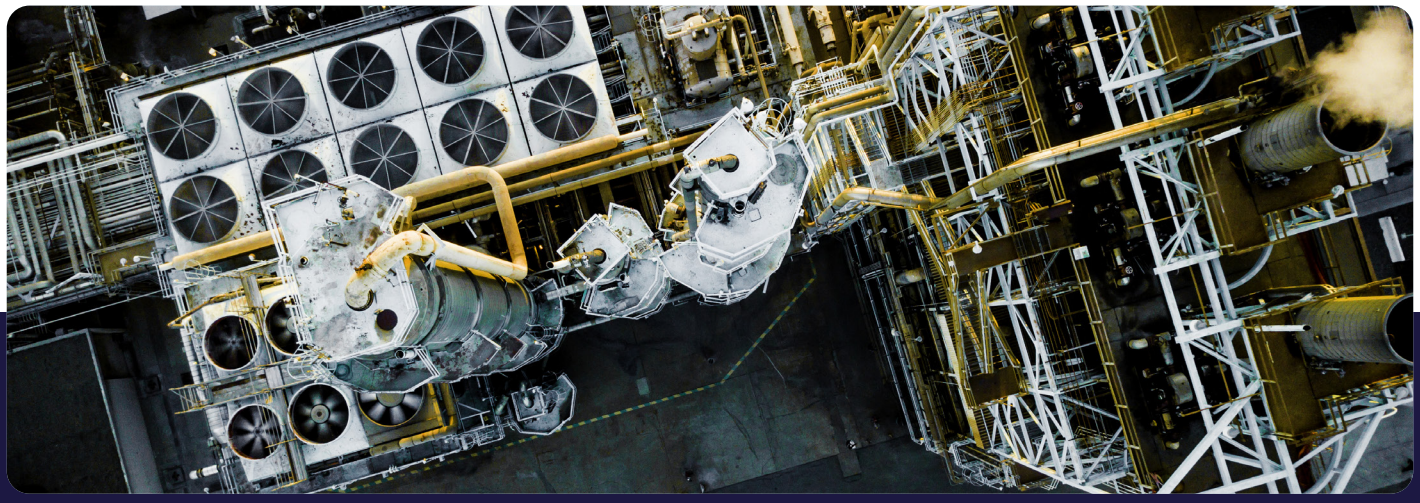
aeroqual

Case Study

Protecting Public Heath in Indonesia with Continuous Real-Time Monitoring

ERM is the premier environmental and social consulting firm in Indonesia, working with leading oil and gas, mining, and manufacturing companies throughout the archipelago.



Project
Gas-fired power plant

Location
West Java, Indonesia

Date
2017 - 2018

Services
2 x AQS 1 Mini Air Quality Stations

Measurements
NO_2, ozone, TSP, PM_{10}, $PM_{2.5}$, PM_1, Wind, Temperature, RH & Pressure

Sector
Oil & Gas

The customer

ERM

Environmental Resources Management (ERM) is a global environmental consultancy with a solid reputation in ambient air quality monitoring. ERM's Indonesia office opened in 1997 and employs 50 people in the capital, Jakarta. As the world's fourth largest population Indonesia is also a major center for oil and gas exploration, and the mining and metals industry. ERM is the premier environmental and social consulting firm in Indonesia, working with leading oil and gas, mining, and manufacturing companies throughout the archipelago.

ERM's client, a consortium of Asian companies, is planning to construct and operate a 1760 MW gas-fired

power plant and floating storage and regasification unit (FSRU) in West Java, Indonesia. The project will be one of the largest gas-fired power plants in Asia when it is completed. The $2 billion USD project, to be funded by a consortium of banks and multilaterals, will be integral to Indonesia's strategy to add 35,000 MW of power generation by 2021.

The problem

ERM Indonesia was engaged by its client to undertake an Environmental and Social Impact Assessment (ESIA) in accordance with the International Finance Corporation's (IFC) Environmental, Health and Safety (EHS) guidelines. Emissions to air from the project have the potential for adverse effects on human health, agricultural and sensitive ecology. Continuous and long term automatic monitoring of NO_2 and ozone was required to establish the state of the existing ambient air quality environment (or baseline) and assess potential impacts against relevant air quality standards, objectives and guidelines.

Challenges to the air quality assessment included cost of ownership and transport, and deployment of air monitoring equipment at remote sites without mains power. These factors ruled out traditional U.S. EPA reference analyzers, which are bulky, expensive and require additional infrastructure. ERM did evaluate certain low-cost sensor-based instruments, but found them unsuitable due to insufficient sensitivity and ozone cross-interference with NO_2, which compromised measurement integrity.

> **"The AQS 1 is a low cost and technically robust solution and offered us the best performance relative to U.S. EPA reference analyzers."**
>
> **Edmund Taylor**
> Consultant, ERM

The solution

After significant research, ERM approached Aeroqual for a lightweight, portable and easily deployed, automatic air monitoring system, which could operate using solar panel and batteries for flexibility when locating the monitor on site and offer near reference data quality for NO_2 and ozone. In addition, the remit included integrated weather stations, and capability for particle monitoring during the construction phase.

To meet this need Aeroqual supplied two AQS 1 Mini Air Quality Stations configured to measure NO_2, ozone, TSP, PM_{10}, $PM_{2.5}$, PM_1, wind, temperature, RH and pressure. A local contractor assembled the solar power systems and site installations. Data was transmitted minute by minute via cellular modem to Aeroqual Cloud for secure hosting, analysis and reporting using advanced tools in the software.

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Evaluation

In addition to the two AQS 1 air monitoring stations which are continuous method, ERM deployed radiello® passive/diffusive samplers at six sites to measure the indicative NO_2 annual mean baseline concentration. The results from the diffusion tube monitoring and the AQS 1 hourly data indicated that ambient NO2 concentrations at all sites were below the relevant air quality standards and the receiving airshed could thus be classified as non-degraded. The ozone data collected from the AQS 1 stations was used to determine the NO_x to NO_2 conversion of modelled NO_2 predictions also reported in the ESIA.

Following best practice, at the end of the monitoring program ERM performed on site calibrations of the AQS 1 stations and used these to validate the datasets. The high temporal data showed good correlation with the diffusion tube dataset. In summing up his experience with the instruments, Edmund Taylor, Consultant at ERM says, “The AQS 1 is a low-cost and technically robust solution for monitoring ambient air quality. The monitors proved to be reliable, with no significant operational issues throughout the 12-week campaign and offered us the best performance relative to U.S. EPA reference method analyzers.”

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